Remarks

I.   Summary of Office Action

Claims 1-111 are pending in this case. Claims 1, 23, 34, 56, 97 and 105 are independent claims.

Claims 1-9, 12, 17, 19-24, 32, 34-42, 50, 52-57, 65 and 95-111 were rejected under 35 U.S.C. § 103 as being obvious from Vilmur *et al.* U.S. Patent No. 4,811,404 ("Vilmur") taken alone or in combination with Ephraim *et al.* "Speech Enhancement Using a Minimum Mean-Square Error Short-Time Spectral Amplitude Estimator," IEEE Trans., Vol. ASSP-32, No. 6, pp. 1109-1121 (Dec. 1984) ("Ephraim") and/or Cappe "Elimination of the Musical Noise Phenomenon with the Ephraim and Malah Noise Suppressor," IEEE Trans. On Speech and Audio Processing, Vol. 2, No. 2, pp. 345-349 (Apr. 1994) ("Cappe").

Dependent Claims 10, 11, 13-16, 18, 25-31, 33, 43-49, 51, 58-64 and 66-94 were rejected as being dependent upon a rejected base claim, but were indicated as allowable if rewritten in independent form to include all the limitations of the base claim and any intervening claims.

II.   Summary of Applicant's Reply

Applicant wishes to thank the Examiner for acknowledging the allowability of dependent Claims 10, 11, 13-16, 18, 25-31, 33, 43-49, 51, 58-64 and 66-94. Although applicant has not rewritten these claims in independent form, applicant has amended corresponding independent Claims 1, 23, 34 and 56 to include features noted in the Office Action as being allowable over the references of record. Applicant has cancelled Claims 97-111 without prejudice. Applicant reserves the right to pursue the subject

matter of the unamended claims and the subject matter of Claims 97-111 in one or more continuing applications related to the present application.

Applicant has amended the title and abstract as suggested by the Examiner in the Office Action.

Applicant has amended the drawings to address the objections noted in the Office Action.

Reconsideration and allowance of this application in light of the following remarks is respectfully requested.

III.   <u>35 U.S.C. § 103 Rejection</u>

Independent Claims 1, 23, 34 and 56 were rejected as being obvious from Vilmur taken alone or in combination with Ephraim and/or Cappe. However, the Examiner acknowledged in the Office Action that "the prior art does not teach . . . the calculations based upon LPC prediction error" (Office Action, § 6).

Applicant respectfully disagrees with the Examiner's obviousness rejection, because 35 U.S.C. § 103 requires that the proposed combination of references be taught or suggested by the prior art. Simply having the Examiner state that something would work better if modified (see e.g., p. 5 of the Office Action, first full paragraph) is not a teaching or suggestion provided by the cited art. Nevertheless, strictly for purposes of expediting prosecution, applicant has amended the claims to include additional elements which even the Examiner agrees are not present in the cited art.

Particularly, applicant has amended Claims 1, 23, 34 and 56 in order to specify the "determining [of] . . . a respective current estimate of the noise energy . . . <u>wherein said respective current estimate of the noise energy is determined as a function of a linear</u>

predictive coding (LPC) prediction error" (emphasis supplied). Similarly, applicant has

amended Claims 23 and 56 to specify "determining, as a function of a linear predictive

coding (LPC) prediction error, whether at least a respective one of said plurality of

frames is a non-speech frame" (emphasis supplied). Support for the amendments can be

found in the originally-filed application at, for example, page 8, lines 6-20 and page 11,

line 15 to page 13, line 5. No new matter has been added.

Thus, the foregoing demonstrates that independent Claims 1, 23, 34 and 56 are

allowable over the references of record. Accordingly, the Examiner is respectfully

requested to withdraw the 35 U.S.C. § 103 rejection of independent Claims 1, 23, 34

and 56 and corresponding dependent Claims 2-22, 24-33, 35-55 and 57-96.

IV.   Amendments to the Title

In the Office Action, the Examiner objected to the title as being verbose, and

stated that the phrase "Method [of] and Apparatus for" should be deleted (Office Action,

p. 2). In response, applicant has amended the title as suggested by the Examiner.

Accordingly, the Examiner is respectfully requested to withdraw the objection to the title.

V.   Amendments to the Abstract

In the Office Action, the Examiner objected to the abstract "because of poor

grammar regarding the prepositional phrase "of optimal filtering" to describe frequency

domain and improper use of the word 'two' in 'signal-two-noise ratio'" (Office Action,

p. 2).

In response, applicant has amended the abstract to recite that "[a]coustic noise for

wireless or landline telephony is reduced through optimal filtering . . ." Additionally,

applicant directs the Examiner's attention to the Supplemental Preliminary Amendment

filed by applicant on April 24, 2000, in which the word "two" in "signal-to-noise ratio" was changed to --to--.

Accordingly, the Examiner is respectfully requested to withdraw the objection to the abstract.

VI.   Amendments to the Drawings and Specification

In the Office Action, the Examiner objected to Figures 1, 3, 5 and Table 1 (Office Action, pp. 2-3). Attached are new Figures 1, 3, 5 and 6 in this application which are responsive to the objections. Applicant has also amended the specification in response to the objections. Each of the new figures is labeled in the header as a "Replacement Sheet" in accordance with 37 C.F.R. § 1.121(d). The new drawing sheets replace Figures 1, 3, 5 and Table 1, respectively, which accompanied the originally-filed application. Attached are annotated sheets showing the changes to the drawings. No new matter has been added. Each of the objections to the drawings will now be addressed in turn.

With respect to Figure 1, the Examiner stated that the recitation of "Related Art" should read "Prior Art" instead. In response, applicant has amended Figure 1 to read "Prior Art."

With respect to Figure 3, the Examiner noted that "[n]o reference is made in the specification to the blocks numbered in figure 3 nor do the blocks have descriptions or abbreviations inside them. The extraneous text of figure 3 should be placed in appropriate blocks or removed. It is unclear what relationship exists between blocks 302, 304, 306, 308 and 312 because no indication of data flow or input/output is evident. Two lines fail to interconnect or show direction of data flow between any elements of figure 3."

In response, applicant has amended the specification to make reference to

blocks 302-312. Particularly, the specification has been amended to recite "[t]he

difference of the log frame energy is equivalent to determining the ratio of the energy

between the current frame 312 and each of the last K frames 302, 304, 306 and 308." No

new matter has been added. Additionally, applicant has amended Figure 3 to place the

text inside appropriate boxes. The lead lines have been connected to these boxes to show

that the maximum difference between energies 302-310 and 312 is compared to a

threshold, as described in the corresponding description of Figure 3 in the specification

(see p. 11, l. 15 to p. 12, l. 7 of applicant's specification).

With respect to Figure 5, the Examiner stated that "Figure 5 is objected to as a

'black box' depiction which fails to show any meaningful processing. The details

contained within block 502 should be shown to give this element significant meaning or

the figure should be labeled as 'prior art'." In response, applicant has amended Figure 5

to show the description of the filter gain G(f) described in the specification (p. 18, ll. 1-9),

and to show the relation described in the specification between the input and output

energies of the speech bands as a function of the filter gain G(f) (p. 19, ll. 7-10).

With respect to Table 1, the Examiner stated "Table 1 was included on a separate

sheet instead of in the specification where tables are supposed to appear. It is unclear

whether this was an intentional attempt to improperly treat a table as a drawing. If the

applicant prefers having Table 1 as a drawing, then it must be properly labeled as such

with reference numbers to the specification." In response, applicant has amended Table 1

to read "Figure 6" and to include reference numerals. Applicant has also amended the

specification to make reference to "Figure 6" instead of "Table 1" and to the reference

numerals. No new matter has been added.

Accordingly, the Examiner is respectfully requested to withdraw the objections to

the drawings.

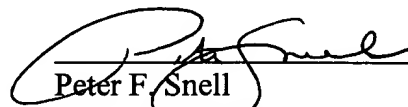## VII. Contingent Request for Telephonic Interview

If for any reason the Examiner decides not to allow this application based on this

Reply, applicant respectfully requests a telephonic interview with the Examiner before

the issuance of a final Office Action.

VIII. Conclusion

Applicant respectfully submits that the foregoing demonstrates that this

application is in condition for allowance. Accordingly, prompt consideration and

allowance of this application are respectfully requested.

Dated: July 21, 2005

Respectfully submitted,

Peter F. Snell
Reg. No. 52,235
Agent for Applicant
c/oMINTZ LEVIN COHN FERRIS
GLOVSKY & POPEO, P.C.
Chrysler Center
666 Third Avenue, 24th Floor
New York, NY 10017
Tel: (212) 935-3000
Fax: (212) 983-3115

Amendments to the Drawings:

Attached are new Figures 1, 3, 5 and 6 in this application, each of which is

labeled in the header as a "Replacement Sheet" in accordance with 37 C.F.R. § 1.121(d).

These drawing sheets replace Figures 1, 3, 5 and Table 1, respectively, which

accompanied the originally-filed application. Also attached are annotated sheets showing

the changes. A description of the changes is included in the remarks section of this
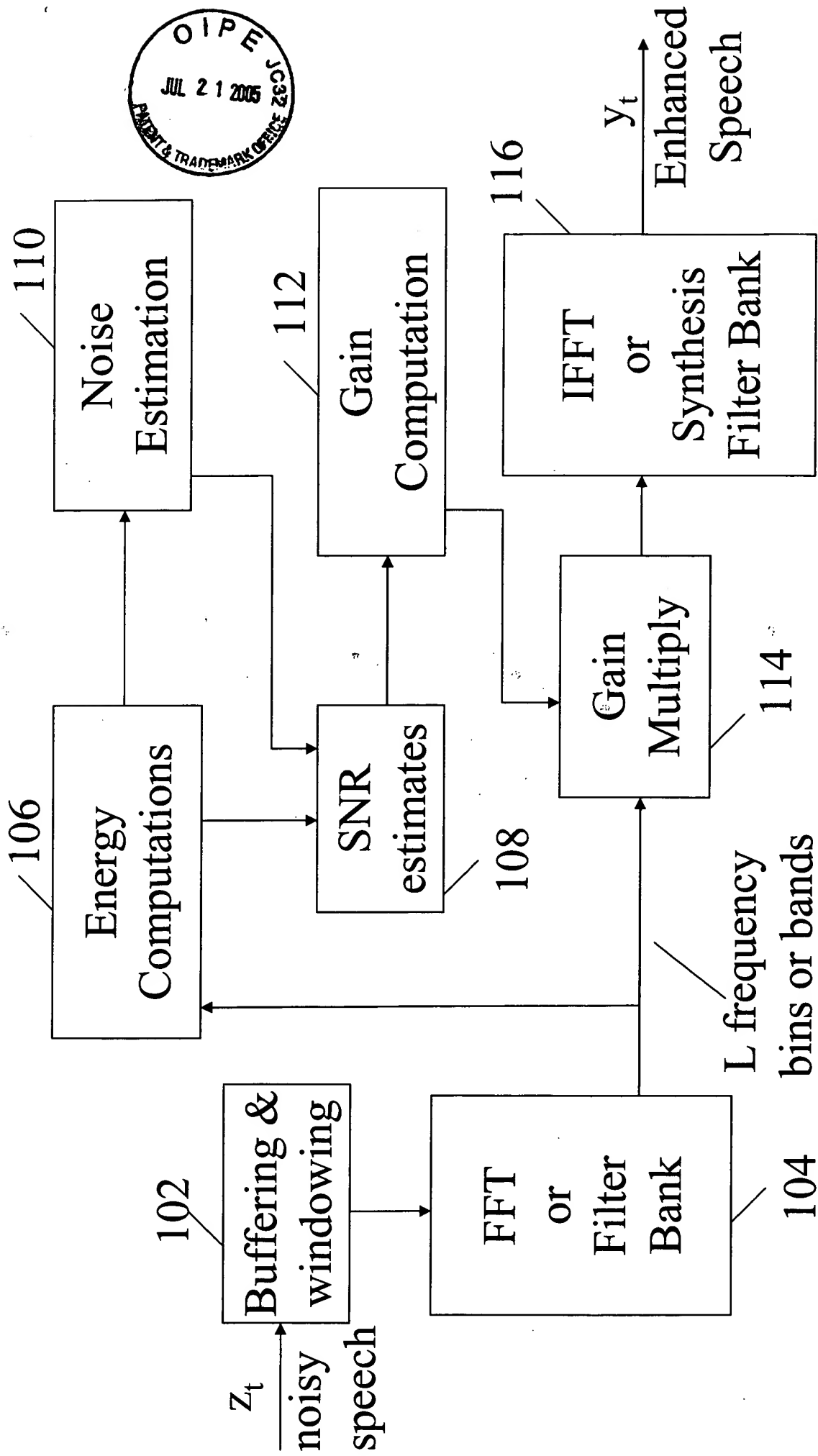
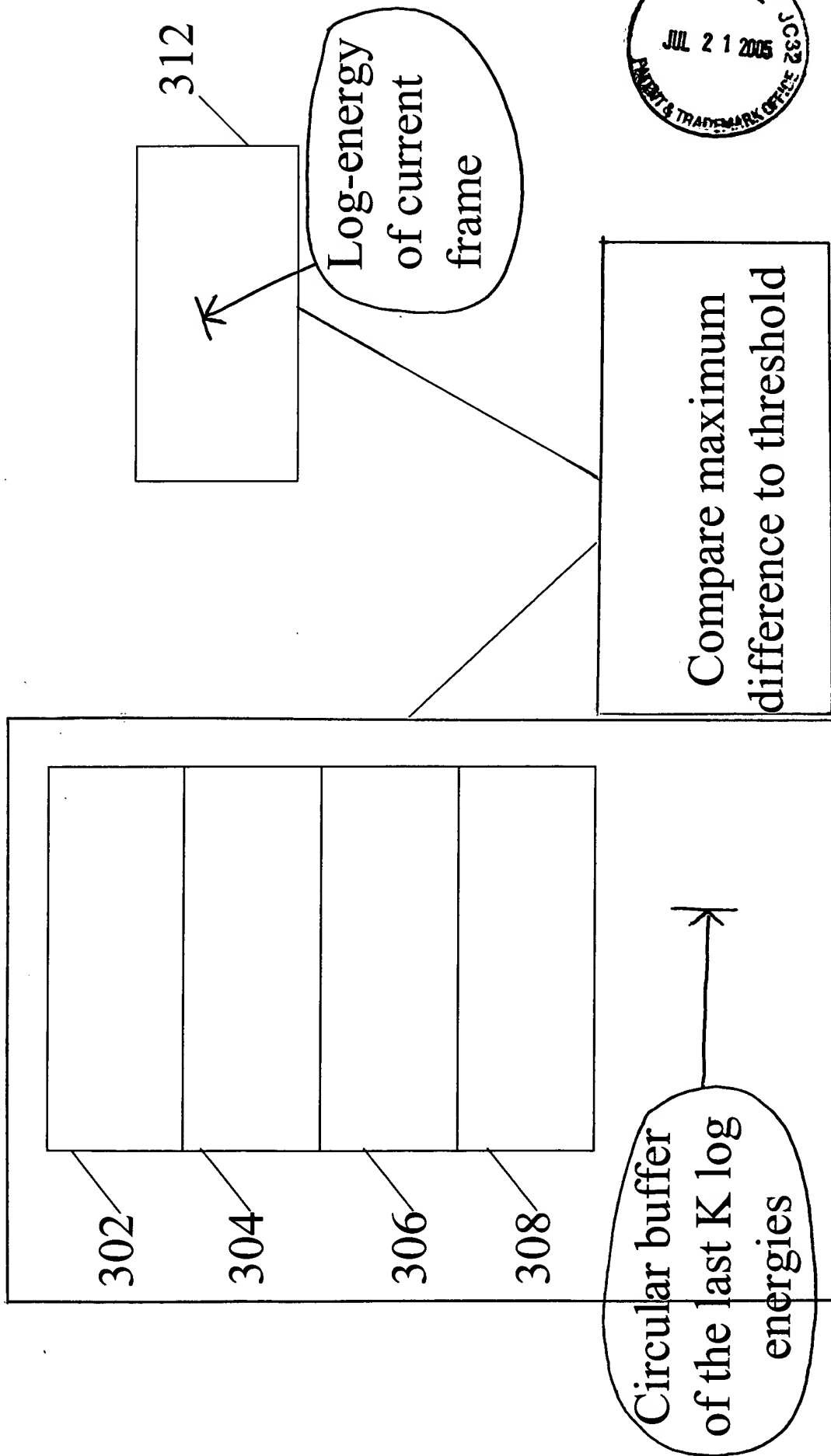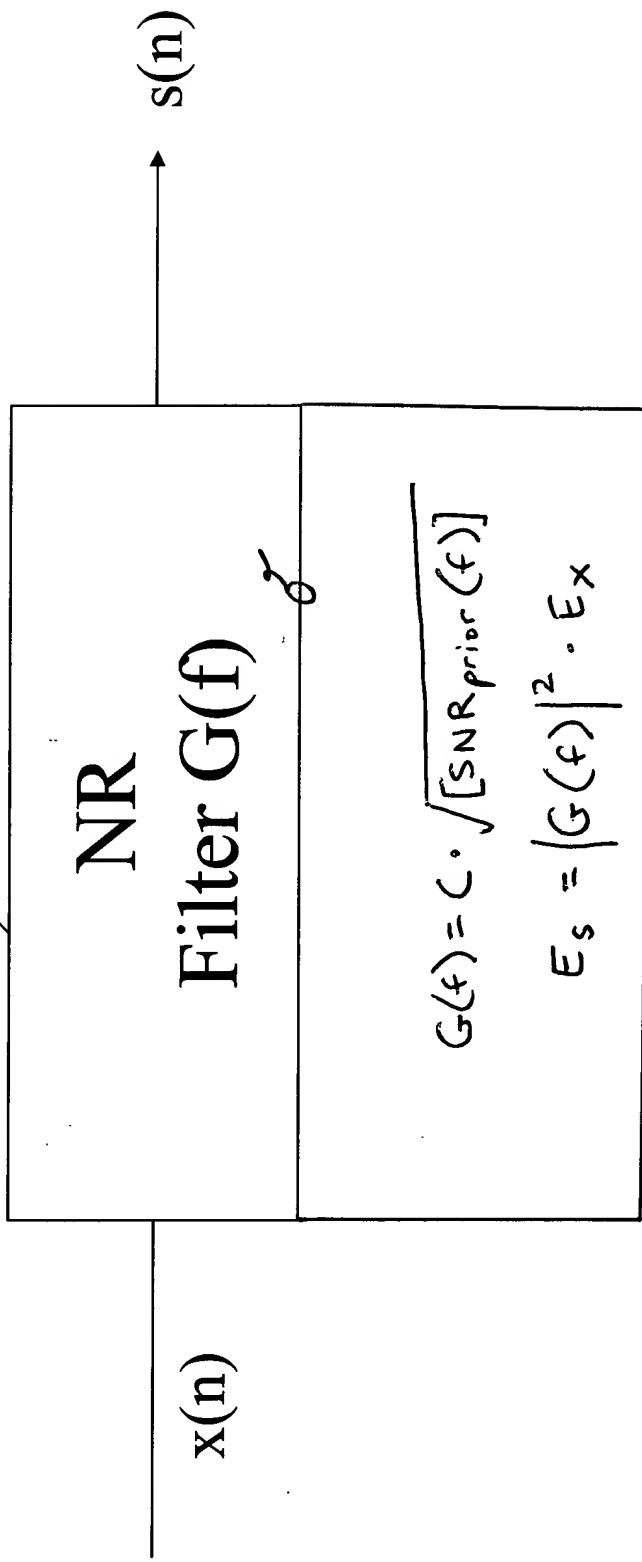Reply.

FIG. 1

PRIOR
RELATED ART

312

Log-energy of current frame

Compare maximum difference to threshold

302

304

306

308

Circular buffer of the last K log energies

FIG. 3

x(n) →

502

NR
Filter G(f)

$G(f) = c \cdot \sqrt{[SNR_{prior}(f)]}$

$E_s = |G(f)|^2 \cdot E_x$

→ s(n)

FIG. 5

Case	Conditions to be met	value of update constant α
Watch dog timer expired	$UpdateTimer > TimeOut$ $PredErr > T_{PE1}$	$\alpha = 0.002$
Frame is stationary	Stationary counter is > 0.5 sec.	$\alpha = 0.05$
Frame speech likelihood indicates non-speech	$SpeechLikelihood < T_{LIK}$ $PredErr > T_{PE2}$	$\alpha = 0.1 \cdot SpeechLikelihood$ with $\alpha \le 0.1$
The LPC residual of the frame has near-zero skewness	$\lvert \gamma_3 \rvert < T_a$, $\lvert \gamma_3 \rvert < T_b$, $PredErr > T_{PE2}$	$\alpha = 0.05$
Noise energy is dropping	Current noise energy estimate > total energy	$\alpha = 0.1$

602 — 604 — 606 — 608 — 610

TABLE 1

FIG. 6